

What is claimed is:

1. An exposure device for irradiating an exposure beam to a substrate having a resist formed thereon to form a latent image on the resist, comprising:

5        a substrate holding portion for holding the substrate; a driving portion for varying an irradiation position of the exposure beam relatively to the substrate; and a cooling portion for cooling the substrate during irradiation of the exposure beam.

10 2. The exposure device according to claim 1, further comprising: an irradiation position detector for detecting the irradiation position of the exposure beam; a temperature detector for detecting the temperature at the irradiation position; and a temperature controller for controlling the 15 temperature of the irradiation position on the basis of the temperature detected by the temperature detector.

3. The exposure device according to claim 1, wherein the substrate is mounted on the substrate holding portion and the cooling portion is a cooling pipe provided in the substrate 20 holding portion.

4. The exposure device according to any one of claims 1 to 3, wherein the exposure beam is an electron beam.

5. The exposure device according to claim 1, wherein the resist is a chemical amplification resist.

25 6. The exposure device according to claim 1, wherein the exposure beam is a light beam, and the cooling portion is a cooling device.

7. An exposure device for irradiating an exposure beam to a substrate having a resist formed thereon, comprising:

a substrate mount portion for holding the substrate;

a spindle for rotating the substrate mount portion;

5 a fluid bearing portion for holding the spindle; and

a conduit pipe for supplying cooling fluid through the fluid bearing portion and the spindle to the substrate mount portion.

8. The exposure device according to claim 7, wherein the

10 spindle has a groove portion through which the cooling fluid supplied through the fluid bearing portion is taken into the conduit pipe provided in the spindle.

9. The exposure device according to claim 7, further

comprising a cooling fluid supply portion and a cooling fluid 15 supply conduit pipe for supplying cooling fluid from the cooling fluid supply portion to the conduit pipe provided in the spindle.

10. An exposure device for irradiating an exposure beam to a substrate having a resist formed thereon, comprising:

a substrate mount portion for holding the substrate;

20 a spindle for rotating the substrate mount portion;

a bearing portion for holding the spindle, and

a cooling fluid supply portion and a cooling fluid supply 25 conduit pipe, provided independently of the bearing portion, for supplying cooling fluid from the cooling fluid supply portion to a conduit pipe provided in the spindle.

11. An exposure device for irradiating an exposure beam to

a disc-shaped substrate having a resist formed thereon to form

a latent image on the resist, comprising:

a substrate mount portion for holding the substrate and rotating the substrate;

an irradiating portion for irradiating the exposure beam

5 to the substrate; and

a low temperature member that is disposed at the exposure surface side of the substrate and at the rotational downstream side of the irradiation position of the exposure beam.

12. The exposure device according to claim 11, wherein the

10 low temperature member is disposed at the exposure surface side of the substrate and at the opposite side to the irradiation position with respect to the center of the substrate.